

In the claims:

1. (Currently Amended) An isolated and purified nucleic acid molecule encoding an  $\alpha 2\delta$ -4 calcium channel subunit protein, said nucleic acid molecule comprising a member selected from the group consisting of:
- (a) a polynucleotide [nucleic acid molecule] encoding a polypeptide [protein] having a sequence and biological activities substantially same [at least a 95% identity to] as a polypeptide [comprising amino acids 1 to 1090] of SEQ ID NO: 10;
  - (b) a nucleic acid molecule that is complementary to the polynucleotide of (a);
  - (c) a nucleic acid molecule comprising at least 15 sequential bases of the polynucleotide of (a) or (b);
  - (d) a nucleic acid molecule that hybridizes under stringent conditions to the polynucleotide molecule of (a) [and has at least a 95% identity to the nucleic acid encoding a polypeptide comprising amino acids 1 to 1090 of SEQ ID NO:10];
  - (e) a nucleic acid molecule that encodes a splice variant of a human [alpha 2 calcium channel]  $\alpha 2\delta$ -4 calcium channel subunit comprising exon 1B;
  - (f) a nucleic acid molecule that encodes a splice variant of a human [alpha 2 calcium channel]  $\alpha 2\delta$ -4 calcium channel subunit comprising exon 37B;
- and

(g) a nucleic acid molecule that encodes a splice variant of a human [alpha 2 calcium channel]  $\alpha 2\delta$ -4 calcium channel subunit comprising exon 1B and exon 37B.

2. (Currently Amended) [The] Any of the nucleic acid [molecule] molecules of claim 1 wherein the polynucleotide is RNA.

3. (Currently Amended) [The] Any of the nucleic acid [molecule] molecules of claim 1 wherein the polynucleotide is DNA.

4. (Previously Amended) The isolated and purified nucleic acid molecule of claim 1, having a nucleotide sequence of SEQ ID NO:9.

5. (Currently Amended) An expression vector to express an  $\alpha 2\delta$ -4 calcium channel subunit protein in a recombinant host cell, herein said vector contains a nucleic acid sequence encoding a [ $\alpha 2\delta$ -4 calcium channel subunit protein] polypeptide having a sequence and biological activities substantially same as a polypeptide of SEQ ID NO: 10.

6. (Cancelled) The expression vector of claim 5 wherein the expression vector contains a nucleic acid molecule encoding an  $\alpha 2\delta$ -4 calcium channel subunit protein having at least a 95% identity to a polypeptide comprising amino acids 1 to 1090 of SEQ ID NO:10.

7. (Original) A recombinant host cell containing an expression vector of claim 5.
8. (Cancelled) The recombinant host cell of claim 7, wherein said nucleic acid molecule has a nucleotide sequence encoding an  $\alpha 2\delta$ -4 calcium channel subunit protein having at least a 95% identity to a polypeptide comprising amino acids 1 to 1090 of SEQ ID NO.:10.
9. (Withdrawn) A protein, in substantially pure form having at least a 95% identity with a polypeptide comprising amino acids 1-1090 of SEQ ID NO.:10.
10. (Withdrawn) The protein according to claim 9, having an amino acid sequence of: SEQ.ID.NO.:10.
11. (Withdrawn) A monospecific antibody immunologically reactive with an  $\alpha 2\delta$ -4 calcium channel subunit protein.
12. (Withdrawn) The antibody of claim 11, wherein the antibody blocks activity of the  $\alpha 2\delta$ -4 calcium channel subunit protein.
13. (Currently Amended) A method for expressing an  $\alpha 2\delta$ -4 calcium channel subunit protein in a recombinant host cell, comprising the steps of:
  - (a) [transferring] introducing an expression vector coapable of encoding an  $\alpha 2\delta$ -4 calcium channel subunit protein into a cell; and

(b) culturing the cells under conditions that allow expression of the  $\alpha 2\delta$ -4 calcium channel subunit protein from the expression vector.

14. (Withdrawn) A method for identifying compounds that alter  $\alpha 2\delta$ -4 calcium channel subunit protein activity in a cell, comprising the steps of:

- a) contacting a compound with a cell containing an  $\alpha 2\delta$ -4 calcium channel subunit, and
- b) measuring a change in the cell in response to the contacting step.

15. (Withdrawn) The method of claim 14 wherein the cell contains three additional calcium channel subunits: an alpha2 subunit, a beta subunit, and a gamma subunit; and wherein the three subunits and the  $\alpha 2\delta$ -4 subunit form a calcium channel complex.

16. (Withdrawn) The method of claim 15 wherein the calcium channel complex is an L-type Voltage Sensitive Calcium Channel.

17. (Withdrawn) The method of claim 15 wherein the measuring step is measuring the influx of  $\text{Ca}^{2+}$  into the cell.

18. (Withdrawn) A method comprising the steps of:  
(a) incubating a cell membrane from a cell expressing recombinant  $\alpha 2\delta$ -4 with radioactive gabapentin (GBP) and a candidate compound, wherein the membrane

comprises an  $\alpha 2\delta$ -4 subunit of calcium channel and wherein the incubating step is for sufficient time to allow GBP binding to the  $\alpha 2\delta$ -4 subunit of calcium channels in the cell membranes,

- (b) separating the cell membranes from unbound radioactive GBP,
- (c) measuring binding of the radioactive GBP to the cell membranes, and
- (d) identifying a compound that inhibits GBP binding by a reduction of the amount of radioactive GBP in step (c) to an established control.

19. (Withdrawn) A method for identifying compounds that alters  $\alpha 2\delta$ -4 calcium channel subunit protein activity, comprising the steps of:

- (a) combining a compound, a measurably labeled ligand for the  $\alpha 2\delta$ -4 calcium channel subunit protein, and a  $\alpha 2\delta$ -4 calcium channel subunit protein, and
- (b) measuring binding of the compounds to the subunit protein by a reduction in the amount labeled ligand binding to the  $\alpha 2\delta$ -4 calcium channel subunit protein.

20. (Withdrawn) A compound active in any one of the methods of claim 14, claim 18, or claim 19, wherein said compound is an agonist or antagonist of an  $\alpha 2\delta$ -4 calcium channel.

21. (Withdrawn) A compound active in the method of claim 14, wherein said compound is a modulator of expression of a  $\alpha 2\delta$ -4 calcium channel subunit.

22. (Withdrawn) A pharmaceutical composition comprising a compound active in the method of claim 14, wherein said compound is a modulator of calcium channel activity.

Please add the following claim:

23. (New) A poly peptide having a sequence and biological activities substantially same as a polypeptide of SEQ ID NO: 10.